IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant: Cheng-Chung Lee

Group Art Unit: 2879

Serial No.: 09/864,013

Examiner: Jason R. Phinney

Filed: May 23, 2001

For: Field Emission Display Panels Incorporating Cathodes Having Narrow Nanotube Emitters Formed on Dielectric Layers

Attorney Docket No.: 64,600-076

EXPRESS MAIL CERTIFICATE

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Date of Deposit Sept. 29, 2003

I hereby certify that this paper in triplicate and a credit card payment form in the amount of $320.00 (required filing fee) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and is addressed to: Mail Stop: Appeal, Commissioner for Patents, Alexandria, VA 22313-1450

Kathy Dixon

APPEAL BRIEF

Mail Stop: Appeal
Commissioner for Patents
Alexandria, VA 22313-1450

Sir:

Appellants appeal in the captioned application from the Examiner's final rejection, dated May 28, 2003, of claims 1-3, 5-12 and 21-28, under 35 USC §102(e) based on Deguchi '091 and §103(a) based on Deguchi '091, Moore '433, Zettl '637, Kiyomiya '823 and Hidler '502.

It is urged that the rejection be reversed and that all the claims be allowed.

(1) **REAL PARTY IN INTEREST**

The real party in interest in the present appeal is the recorded Assignee of Industrial Technology Research Institute.

(2) **RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences that are known to the Appellants, the Appellants' legal representative, or the assignee.

(3) **STATUS OF CLAIMS**

Claims 1-3, 5-12 and 21-28 are pending in the application.

Claims 1-3, 5-12 and 21-28 stand rejected. No claims are allowed.

(4) **STATUS OF AMENDMENTS**

A Request For Reconsideration was filed on or about July 31, 2003.

An Advisory Action was received from the Examiner dated Aug. 20, 2003, maintaining rejection of all claims.

A Notice of Appeal was filed on or about Aug. 28, 2003.

(5) SUMMARY OF THE INVENTION

The invention is directed to an emission display panel that incorporates cathodes fabricated with a narrow nanotube emitter layer on top of a wide dielectric layer and a method for such fabrication.

(Specification, paragraph 001)

In a preferred embodiment, a field emission display panel is provided which includes a first electrically insulating plate; a plurality of emitter stacks formed on the first electrically insulating plate, each of the emitter stacks is positioned parallel to a transverse direction of the first insulating plate and includes a layer of a first electrically conductive material that has a first width and a layer of nanotube emitter that has a second width on top, the second width is less than 3/4 of the first width; a plurality of rib sections formed of an insulating material in between the plurality of emitter stacks providing electrical insulation therein between; a second electrically insulating plate is positioned over and spaced apart from the first electrical insulating plate that has an inside surface facing the first plate; a layer of a second electrically conductive material on the inside surface of the second insulating plate; a multiplicity of strips of flourescent powder on the second electrically conductive material each for emitting a red, green or blue light upon activation by

electrons emitted by the plurality of emitter stacks; and a plurality of side panels joining peripheries of the first and second electrically insulating plates together forming a vacuum-tight cavity therein.

(Specification, paragraph 0026)

(6) **ISSUES**

Issue I

Is the rejection of claims 1-3, 5, 7-9 and 12 under 35 USC §102(e) based on Deguchi '091 proper when such reference does not teach or suggest the specifically claimed limitations in the present application?

Issue II

Is the rejection of claim 6 under 35 USC §103(a) based on Deguchi and Moore proper when such references do not teach or suggest the specifically claimed limitations in the present application?

Issue III

Is the rejection of claims 10-11 under 35 USC §103(a) based on Deguchi, Zettl and Kiyomiya proper when such references do not teach or suggest the specifically claimed limitations in claims 10 and 11?

Issue IV

Is the rejection of claims 21-24, 26 and 28 under 35 USC §103(a) based on Deguchi and Hidler proper when such references do not teach or suggest the specifically claimed limitations in those claims?

Issue V

Is the rejection of claim 25 under 35 USC §103(a) based on Deguchi, Hidler and Moore proper when such references do not teach or suggest the specifically claimed limitations in claim 25?

Issue VI

Is the rejection of claim 27 under 35 USC §103(a) based on Deguchi, Hidler and Zettl proper when such references do not teach or suggest the specifically claimed limitations in claim 27?

(7) **GROUPING OF CLAIMS**

The rejection of claims 1-3, 5, 7-9 and 12 are contested as a group.

The rejection of claim 6 is contested as a separate group.

The rejection of claims 10 and 11 are contested as a group.

The rejection of claims 21-24, 26 and 28 are contested as a group.

The rejection of claim 25 is contested as a separate group.

The rejection of claim 27 is contested as a separate group.

(8) **ARGUMENTS**

Issue I

Claims 1-3, 5, 7-9 and 12 are rejected under 35 USC §102(e) as being anticipated by Deguchi '091. It is contended that Deguchi discloses a field emission display panel including the feature that the width of the nanotube layer is less than 3/4 the width of the first electrically conductive material, as shown in Deguchi's Fig. 1A.

The rejection of claims 1-3, 5, 7-9 and 12 under 35 USC §102(e) based on Deguchi is improper and must be reversed.

Deguchi discloses an electron emission element and image output device including a substrate, a cathode formed on the substrate, an anode opposed to the cathode, an electron emission member disposed on the cathode, and a control electrode disposed between the cathode and the anode. (See Abstract) The electron emission member 14, as specifically described at col. 5, line 36, as:

> "The electron emission member 14 is **formed as a circular thin film** for example, as shown in Figs. 1A and 1B. Alternatively, the electron emission member 14 may be formed into a cone-shape."

Furthermore, at col. 6, lines 13-15:

> "When being made of diamond having a thin film shape, the electron emission member 14 can be **formed in any shape at any position** by photolithography or the like."

The Appellants respectfully submit that the disclosure of Deguchi does not teach the present invention key element as recited in independent claim 1:

> "... comprises a layer of a first electrically conductive material having a first width and a layer of nanotube emitters having a second width on top, **said second width being less than 3/4 of said first width;**"

Figure 1A of Deguchi shows the electron emission member 14 on top of the cathode 12 as an illustration. The Appellants failed to find in any place of Deguchi teaching of the width of the electron emission member must be smaller than the width of the cathode, let alone the teaching that "second width being less than 3/4 of said first width".

Moreover, the disclosure at col. 6, line 13 teaches the opposite of the present invention independent claim 1, i.e. in that the electron emission member 14 **can be formed in any shape at any position**. There is no teaching in Deguchi that the second width (of the nanotube emitter) should be less than 3/4 of the first width (of the cathode).

Dependent claims 2-3, 5, 7-9 and 12 depend on independent claim 1, which the Appellants have clearly shown is not anticipated by Deguchi. By the same reasoning, the Appellants respectfully submit that dependent claims 1-3, 5, 7-9 and 12 are likewise not anticipated by Deguchi '091. Particularly, dependent claim 2, which further recites that the nanotube layer having **a width less than 3/4 and more than 1/4** the width of the cathode layer, is not taught, disclosed or suggested by Deguchi in Fig. 1A.

The rejection of claims 1-3, 5, 7-9 and 12 under 35 USC §102(e) based on Deguchi is improper and must be reversed.

Issue II

Claim 6 is rejected under 35 USC §103(a) as being unpatentable over Deguchi '091 in view of Moore '433. It is contended that while Deguchi fails to teach that the layer of a first electrically conductive material is a silver paste, such is disclosed by Moore.

The rejection of claim 6 under 35 USC §103(a) based on Deguchi and Moore is improper and must be reversed.

The Appellants have clearly shown that Deguchi does not teach the present invention independent claim 1, which requires a width of the nanotube emitters to be less than 3/4 of the width of the cathode, which is not taught or disclosed by Deguchi.

Claim 6 depends on independent claim 1, and as such, is likewise not taught or disclosed by Deguchi and Moore.

Issue III

Claim 10 is rejected under 35 USC §103(a) as being unpatentable over Deguchi '091 in view of Zettl '637.

Claim 11 is rejected under 35 USC §103(a) as being unpatentable over Deguchi '091 in view of Kiyomiya '823.

The rejection of claims 10 and 11 under 35 USC §103(a) based on Deguchi, Zettl and Kiyomiya is improper and must be reversed.

Similar to the reasoning presented above regarding the Deguchi reference, which the Appellants have clearly shown does not teach the present invention independent claim 1 which requires a width of the nanotube emitters to be less than 3/4 of the width of the cathode, the Appellants respectfully submit that the Zettl

reference and the Kiyomiya reference do not add any additional weight in a §103(a) rejection based on Deguchi.

The rejection of claims 10 and 11 based on Deguchi, Zettl and Kiyomiya is improper and must be reversed.

Issue IV

Claims 21-24, 26 and 28 are rejected under 35 USC §103(a) as being unpatentable over Deguchi '091 in view of Hidler '502. It is contended that while Deguchi fails to show that the first and second electrically insulating plates are formed of a ceramic material that is substantially transparent, such is shown by Hidler.

The rejection of claims 21-24, 26 and 28 under 35 USC §103(a) based on Deguchi and Hidler is improper and must be reversed.

Hidler '502 discloses an electroluminescent display device (ELD) which uses sub-pixel electrodes connecting vias in insulating layers. As disclosed by Hidler, col. 2, lines 51-55:

> "The light emitting layer may be a thin film and it may consist of organic electroluminescent materials. The substrate

> may be an opaque or transparent material selected from the group of silicon, ceramics, insulated metals and glass."

The Appellants respectfully submit that the ELD is a completely different device utilizing completely different principles and structures than the present invention device of FED. For instance, **there is no electron emitter required in an ELD**. The principle of operation of an ELD is completely different than that in a FED of the present invention. As such, the Appellants respectfully submit that **there can be no motivation to combine** the two references, which represent two completely different technological areas, in reaching the present invention independent claim 21.

Moreover, the Appellants cannot find any suggestion in either of the Deguchi or the Hidler references as to the desirability of such modification. In re Brouwer, 37 USPQ 2d 1663(Fed. Cir. 1996). Without such suggestions made in either of the references, the basis for the selection of the references and the purported modification must undoubtedly be hindsight drawn from Appellants' disclosure. In re Oetiker, 24 USPQ 2d 1443 (Fed. Cir. 1992).

The rejection of claims 21-24, 26 and 28 under 35 USC §103(a) based on Deguchi and Hidler is improper and must be reversed.

Issue V

Claim 25 is rejected under 35 USC §103(a) as being unpatentable over Deguchi '091 in view of Hidler '502 and further in view of Moore '433. It is contended that Moore teaches that the layer of a first electrically conductive material can be a silver paste because it can be easily printed and formed in various patterns and thereby facilitating production.

The rejection of claim 25 under 35 USC §103(a) based on Deguchi, Hidler and Moore is improper and must be reversed.

The Appellants have clearly shown that since the two primary references of Deguchi and Hidler do not teach the key elements of the present invention that the width of the layer of nanotube emitters is less than 3/4 of the width of the cathode, and further that the first and second electrically insulating plates are formed of a ceramic material that is substantially transparent, the Appellants respectfully submit that the additional reference of Moore does not lend any additional weight in a §103(a) rejection.

Issue VI

Claim 27 is rejected under 35 USC §103(a) as being unpatentable over Deguchi '091, Hidler '502 and further in view of Zettl '637. It is contended that Zettl discloses the layer of nanotube emitters formed of a mixture of nanometer dimensioned tubes of carbon, diamond or diamond-like carbon, and a polymeric-based binder in order to retain the nanotubes in the desired location.

The rejection of claim 27 under 35 USC §103(a) based on Deguchi, Hidler and Zettl is improper and must be reversed.

Dependent claim 27 depends on independent claim 21, which the Appellants have shown is not rendered obvious under Deguchi and Hidler since at least two key elements in claim 21 are not taught, disclosed or suggested by Deguchi and Hidler. The Appellants respectfully submit that the additional reference of Zettl does not lend any additional weight in a §103(a) rejection.

CLOSING

In summary, the Appellants have shown that their claimed invention is fully supported by a body of evidence of non-obviousness and/or non-anticipation. It is therefore respectfully submitted that such evidence of non-obviousness and/or non-anticipation overcomes any showing of obviousness and/or anticipation presented by the Examiner. The Appellants therefore submit that the final rejection of their claims 1-3, 5-12 and 21-28 is improper under 35 USC §102(e) and §103(a).

The reversal of the final rejection is respectfully solicited from the Board.

Respectfully submitted,

Tung & Associates

By: _____

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RWT\kd

CLAIM APPENDIX

1. (Original) A field emission display panel comprising:

a first electrically insulating plate;

a plurality of emitter stacks formed on said first electrically insulating plate, each of said emitter stacks being positioned parallel to a transverse direction of said first insulating plate and comprises a layer of a first electrically conductive material having a first width and a layer of nanotube emitter having a second width on top, said second width being less than 3/4 of said first width;

a second electrically insulating plate positioned over and spaced-apart from said first electrically insulating plate having an inside surface facing said first plate;

a layer of a second electrically conductive material on said inside surface of said second insulating plate;

a multiplicity of strips of fluorescent powder coating on said second electrically conductive material each for emitting a red, green or blue light upon activation by electrons emitted from said plurality of emitter stacks; and

a plurality of side panels joining peripheries of said first and second electrically insulating plates together forming a vacuum-tight cavity therein.

2. (original) A field emission display panel according to claim 1, wherein said second width of said layer of nanotube emitter being between about 1/4 and about 3/4 of said first width of said layer of first electrically conductive material.

3. (original) A field emission display panel according to claim 1, wherein said second electrically insulating plate further comprises a black matrix layer in-between said multiplicity of strips of fluorescent powder coating.

4. (Previously cancelled)

5. (original) A field emission display panel according to claim 1, wherein said layer of a first electrically conductive material is a cathode for said field emission display panel.

6. (original) A field emission display panel according to claim 1, wherein said layer of a first electrically conductive material is a silver paste.

7. (original) A field emission display panel according to claim 1, wherein said layer of second electrically conductive material is a first anode for said field emission display panel.

8. (original) A field emission display panel according to claim 1, wherein said layer of second electrically conductive material is formed of indium-tin-oxide (ITO).

9. (original) A field emission display panel according to claim 1, wherein said layer of nanotube emitter being formed of a mixture of nanometer dimensioned hollow tubes and a binder material.

10. (original) A field emission display panel according to claim 1, wherein said layer of nanotube emitter being formed of a mixture of nanometer dimensioned hollow tubes of carbon, diamond or diamond-like carbon and a polymeric-based binder.

11. (original) A field emission display panel according to claim 1, wherein each of said multiplicity of strips of fluorescent powder coating emits a light of red, green or blue that is different than the light emitted by its immediate adjacent strips when activated by electrons from said plurality of emitter stacks.

12. (original) A field emission display panel according to claim 1, further comprising a second layer of said first electrically conductive material formed on top of a plurality of rib sections for functioning as a second anode.

13. - 20. (previously cancelled)

21. (previously added) A field emission display panel comprising:

a first electrically insulating plate;

a plurality of emitter stacks formed on said first electrically insulating plate, each of said emitter stacks being positioned parallel to a transverse direction of said first insulating plate and comprises a layer of a first electrically conductive material having a first width and a layer of nanotube emitter having a second width on top, said second width being less than 3/4 of said first width;

a second electrically insulating plate positioned over and spaced-apart from said first electrically insulating plate having an inside surface facing said first plate, said first and second electrically insulating plates are formed of a ceramic material that is substantially transparent;

a layer of a second electrically conductive material on said inside surface of said second insulating plate;

a multiplicity of strips of fluorescent powder coating on said second electrically conductive material each for emitting a red, green or blue light upon activation by electrons emitted from said plurality of emitter stacks; and

a plurality of side panels joining peripheries of said first and second electrically insulating plates together forming a vacuum-tight cavity therein.

22. (previously added) A field emission display panel according to claim 21, wherein said second width of said layer of nanotube emitter being between about 1/4 and about 3/4 of said first width of said layer of first electrically conductive material.

23. (previously added) A field emission display panel according to claim 21, wherein said second electrically insulating plate further comprises a black matrix layer in-between said multiplicity of strips of fluorescent powder coating.

24. (previously added) A field emission display panel according to claim 21, wherein said layer of a first electrically conductive material is a cathode for said field emission display panel.

25. (previously added) A field emission display panel according to claim 21, wherein said layer of a first electrically conductive material is a silver paste.

26. (previously added) A field emission display panel according to claim 21, wherein said layer of nanotube emitter being formed of a mixture of nanometer dimensioned hollow tubes and a binder material.

27. (previously added) A field emission display panel according to claim 21, wherein said layer of nanotube emitter being formed of a mixture of nanometer dimensioned hollow tubes of carbon, diamond or diamond-like carbon and a polymeric-based binder.

28. (previously added) A field emission display panel according to claim 21, further comprising a second layer of said first electrically conductive material formed on top of a plurality of rib sections for functioning as a second anode.

10-01-03.

cc:

Attorney Docket No.: 64,600-076

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Cheng-Chung Lee
Serial No.: 09/ 864,013
Filed: May 23, 2001
For: Field Emission Display Panels Incorporating Cathodes Having Narrow Nanotube Emitters Formed on Dielectric Layers

Group Art Unit: 2879
Examiner: Jason R. Phinney

Commissioner for Patents
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF (PATENT APPLICATION-37 CFR 192)

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal Filed on Aug. 28, 2003.

NOTE: "The Appellant shall, within 2 months from the date of the notice of appeal under §1.191(a) or within the time allowed for response to the action appealed from, if such time is later, file a brief in "triplicate", 37 C.F.R. 1.192(a) [emphasis added].

2. STATUS OF APPLICANT
This application is on behalf of:
X other than a small entity.
___ a small entity.

A verified statement:
___ is attached.
___ was already filed.

3. FEE FOR FILING APPEAL BRIEF
Pursuant to 37 CFR 1.17(f), the fee for filing the Appeal Brief is:
___ small entity $160.00
X other than a small entity $320.00

Appeal Brief fee due: $ 320.00

Certificate of Mailing/Transmission (37 CFR 1.8(a))

I hereby certify that this correspondence is, on the date shown below, being:

Mailing
X deposited with the U.S. Postal Service with sufficient postage as Express Mail Label No. EL 994 654 729US in an envelope addressed to Mail Stop: Appeal, Commissioner for Patents, Alexandria, VA 22313-1450

Kathy Dixon

Dated: Sept. 29, 2003

4. EXTENSION OF TERM

NOTE: The time periods set forth in 37 CFR 1.192(a) are subject to the provision of ☐1.136 for patent applications. 37 CFR 1.191(d). See also Notice of November 5, 1985 (1060 O.G. 27).

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply:

(complete (a) or (b), as applicable)

(a) ☐ Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

	Extension (months)	Fee for other than small entity	Fee for small entity
☐	one month	$ 110.00	$ 55.00
☐	two months	$ 410.00	$205.00
☐	three months	$ 930.00	$465.00
☐	four months	$1,450.00	$725.00

Fee: $_____

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

☐ An extension for _____ months has already been secured, and the fee paid therefor of $_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request: $_____

or

(b) ☐ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal Brief Fee: $ 320.00
Extension fee (if any) $_____

TOTAL FEE DUE: $ 320.00

6. FEE PAYMENT

X Attached is a Credit Card Payment Form for the sum of $ 320.00
X Charge American Express Credit Card No. 3715 663193 71002 the sum of $ 320.00.
A duplicate copy of this transmittal is attached.

7. FEE DEFICIENCY

NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

_X_ If any additional extension and/or fee is required, this is a request therefor to charge American Express Credit Card No. 3715 663193 71002

And/Or

_X_ If any additional fee for claims is required, please charge American Express Credit Card No. 3715 663193 71002

Signature of Attorney

Registration No. 31,311

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